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BEHAVIOR OF THE CHINCHS OF SHIELD BUG UNDER THE EFFECT OF PHERO--ETC(U)
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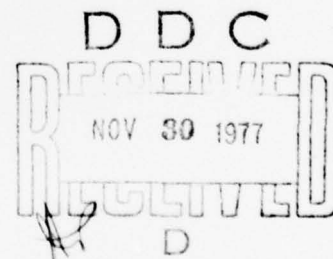
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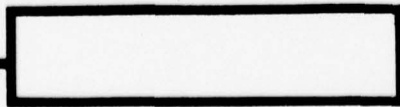
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by

A. V. Likventov



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| Block | Italic | Transliteration | Block | Italic | Transliteration |
|-------|------------|-----------------|-------|------------|-----------------|
| А а | А а | A, a | Р р | Р р | R, r |
| Б б | Б б | B, b | С с | С с | S, s |
| В в | В в | V, v | Т т | Т т | T, t |
| Г г | Г г | G, g | У у | У у | U, u |
| Д д | Д д | D, d | Ф ф | Ф ф | F, f |
| Е е | Е е | Ye, ye; E, e* | Х х | Х х | Kh, kh |
| Ж ж | Ж ж | Zh, zh | Ц ц | Ц ц | Ts, ts |
| З з | З з | Z, z | Ч ч | Ч ч | Ch, ch |
| И и | И и | I, i | Ш ш | Ш ш | Sh, sh |
| Й й | Й й | Y, y | Щ щ | Щ щ | Shch, shch |
| К к | К к | K, k | Ъ ъ | Ъ ъ | " |
| Л л | Л л | L, l | Ы ы | Ы ы | Y, y |
| М м | М м | M, m | Ь ь | Ь ь | ' |
| Н н | Н н | N, n | Э э | Э э | E, e |
| О о | О о | O, o | Ю ю | Ю ю | Yu, yu |
| П п | П п | P, p | Я я | Я я | Ya, ya |

*ye initially, after vowels, and after Ъ, Ь; e elsewhere.
 When written as ě in Russian, transliterate as yě or ě.
 The use of diacritical marks is preferred, but such marks may be omitted when expediency dictates.

GREEK ALPHABET

| | | | | | | |
|---------|---|---|---|---------|---|-----|
| Alpha | A | α | • | Nu | N | ν |
| Beta | B | β | | Xi | Ξ | ξ |
| Gamma | Γ | γ | | Omicron | Ο | ο |
| Delta | Δ | δ | | Pi | Π | π |
| Epsilon | E | ε | • | Rho | Ρ | ρ ϑ |
| Zeta | Z | ζ | | Sigma | Σ | σ ς |
| Eta | H | η | | Tau | Τ | τ |
| Theta | Θ | θ | • | Upsilon | Υ | υ |
| Iota | I | ι | | Phi | Φ | φ ϕ |
| Kappa | K | κ | • | Chi | Χ | χ |
| Lambda | Λ | λ | | Psi | Ψ | ψ |
| Mu | M | μ | | Omega | Ω | ω |

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

| Russian | English |
|-----------|----------------------------|
| sin | sin |
| cos | cos |
| tg | tan |
| ctg | cot |
| sec | sec |
| cosec | csc |
| sh | sinh |
| ch | cosh |
| th | tanh |
| cth | coth |
| sch | sech |
| csch | csch |
| arc sin | \sin^{-1} |
| arc cos | \cos^{-1} |
| arc tg | \tan^{-1} |
| arc ctg | \cot^{-1} |
| arc sec | \sec^{-1} |
| arc cosec | \csc^{-1} |
| arc sh | \sinh^{-1} |
| arc ch | \cosh^{-1} |
| arc th | \tanh^{-1} |
| arc cth | \coth^{-1} |
| arc sch | sech^{-1} |
| arc csch | csch^{-1} |
| <hr/> | |
| rot | curl |
| lg | log |

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Page 173.

BEHAVIOR OF THE CHINCHES OF SHIELD BUG UNDER THE EFFECT OF PHEROMONES

A. V. Likventov.

(All-Union scientific research institute of the protection of plants).

The numerous scientific information, dedicated to research on the floor/sex of pheromones of insects testifies to large interest in this problem both in theoretical and in practical aspects. The presence of floor/sex of pheromones is establish/installed at present more than in 250 form/species [1, 2]. In this case the different orders of insects are represented extremely unevenly. Are most widely enveloped the representatives of the order lepidoptera, and from the order of hemiptera known a total of 4 of form/species, in which are reveal/detected floor/sex pheremones.

Are represented below the results of the investigations, made in

VIZR [- All-Union Institute for Plant Protection] in an example of the risky pest of wheat - shield bug (*Eurygaster integriceps* Put. (Hemiptera: Pentatomidae)).

We establish/installed that of this form/species the meeting of the individuals of the different sex/floor is regulated floor/sex of pheromones which secrete the males. The liberation/excretion of floor/sex of pheromone and the attraction of females are confirmed by the results of field experiment.

For an experiment are used the special traps, which were establish/installed on the field of winter wheat (Fig. 1). As bait served the active virgin insects, placed in breeding enclosures made of egelite mesh. Around each trap at a distance 1.5 m were placed the virgin mature individuals. Experiment is carried out by 3. V 1968 from 10 to 15 h.

Weather conditions favored the manifestation of the vital activity of insects. The temperature of air during the period of observations was increased from 19.8 to 25.2°, wind velocity of south and southeasterly direction did not exceed 2 m per second, heavenly body the Sun.

The first approximation of female to trap is noted for 1 hr. 20

min. after the beginning of experiment. Subsequently they on lone person approached the traps with males throughout the period of observations.

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Striving to approach the breeding enclosure with the drawing individuals, insects fell into trap. The results of experiment (Table 1) bear out the fact that the males draw the nonfertilized females.

The attraction of females into field traps to the pheromone of males was confirmed in the subsequent experiments into 1969-1970.

Visual observations of the behavior of chinchs under natural conditions make it possible to compose the following characteristic of the process of the approach of the individuals.

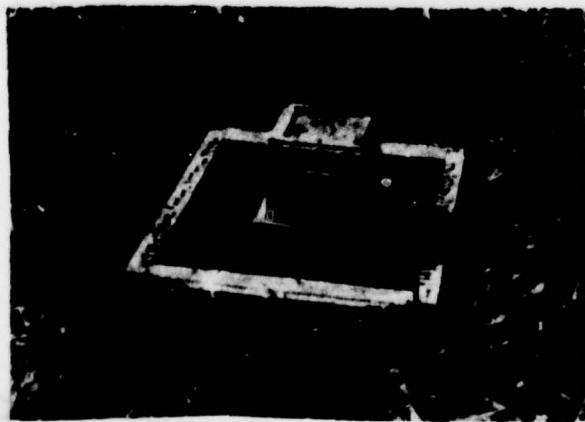


Fig. 1. Experimental field trap. General view.

Table 1. Attraction of the females of shield bug by males.

| (1) № ловушки | (2) Приманка в ловушке | (3) Привлекае- мый пол | (4) Выпущено особей | (5) Выведено ловушками | |
|------------------|------------------------------|------------------------------|---------------------------|---------------------------|----|
| | | | | (6) экз. | % |
| 1 | 10 самцов (7) | самки (8) | 50 | 14 самок (9) | 28 |
| 2 | 9 самцов (7) | " | 50 | 11 | 22 |
| 3 | 15 самцов (7) | самцы (10) | 50 | 1 самец (11) | 2 |
| 4 | контроль (12) | самки (8) | 50 | 0 | 0 |

Key: (1). No trap. (2). Bait in trap. (3). Drawn sex/floor. (4). It is released the individuals. (5). It is caught by traps. (6). copies. (7). males. (8). female. (9). females. (10). males. (11). male. (12). control.

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Males, after selecting the approaching place on the surface of soil or on plant residue/reminders, are stopped, raise themselves on feet and produce vertical vibrations by the abdomen. At this time they secrete clearly perceptible it smelled, recall smelled vanilla. On one place the male remains during 10-17 min. Not having waited until the approach/approximation of female, male transpose, it will move away to 10-20 cm., again it selects position and it repeats motions. With the absence of the female of the action/effect of male they are repeated for hour and more.

Females, after perceiving it smelled the drawing substance they are headed to it towards. The motions of females are accomplished slowly, push, on broken line with frequent cessations and the sounding of air with protruding upward- forward antennas.

With low number and the disjunction of insects, the distance 2 m and more for the meeting of the individuals can be required not one hour and the begun motion of females to male it can prematurely be interrupted under the effect of the exchange of environmental conditions and loss of activity or attendance/departure of insects into shelter.

After the individuals of different sex/floor will draw together themselves up to the distance of several centimeters, they become considerably more active. In this case appear the response reactions of males for the approach/approximation of females.

The characteristic of the mutual reactions of the individuals at close distance is comprised according to observed data under laboratory conditions. Observations were conducted on the special arena, which was glass crystallizer 35 cm. in diameter with the height of walls 8-9 cm. The bottom of arena was lined/covered by filter paper. For illumination and preheating of arena is used the table lamp by power 75-100 W with spherical reflector.

During observations the temperature in the illuminated arena varied from 23 to 28-30°. These conditions completely provided the manifestation of the activity of the individuals.

As a result of repeated observations of the approach of the individuals is established/installed the known stereotype quality of this process. one of the cases is fixed by means of the sketching of the path of motion of female and male (Fig. 2).

Initially active male and female were located at a distance of approximately 8 cm. from each other. After 15-20 s after male began

to vibrate with the abdomen, female was guided to the side of male, but it passed by in immediate proximity. After repeated vibration the female stopped and answered by the same vibration.

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The latter caused the immediate motion of male to the side of female. Before male approached itself the place of the vibration of the female, the latter went away centimeters to 5 and again it began to vibrate. Male reacted during the vibration of female and approached itself it. Then followed the impulse actions of both individuals, the feeling of body by antennas and copulation.

To entire process of the approach of the individuals it was required by 3 min.

During the multiple repetition of experiments is recorded the different duration of the approach of the individuals. In certain cases the time from the beginning of mutual reactions to the torque/moment of whipgrafting was increased to 10-15 min. and more (Table 2).

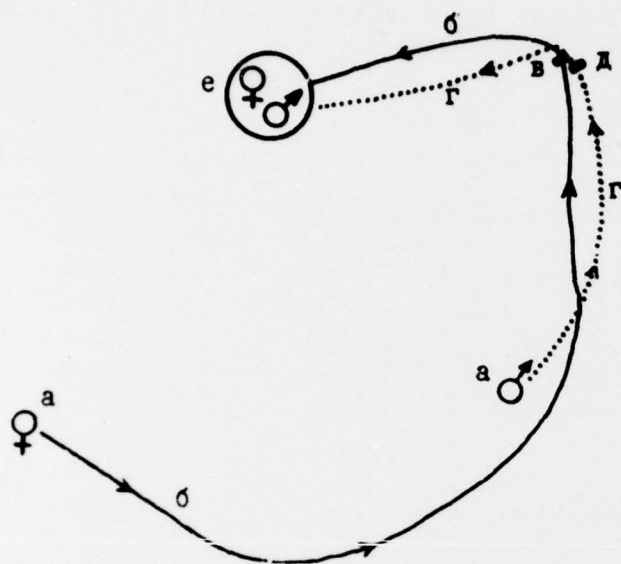


Fig. 2.

Fig. 2. Way of the approach of the individuals of shield bug. a) (10 hr. 47 min.) the original position of the individuals, male vibrates; b) the way of the female, that reacts during the vibration of male; c) the cessation of female after the repeated vibration of male and reciprocal vibration; d) the way of male, which reacts to the vibration of female; e) the short cessation of male (female left); f) (10 hr. 50 min.) the place of mutual reactions and mating.

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In this case was outlined the presence of known rhythm in the behavior of insects. The individuals were more active in II half of day (after 16 hr.), when approach time did not exceed 6 min. All cases of the delayed approach occurred into I half of day (from 10 to 14 hr.).

The drawing action/effect of pheromone of males by the confirmed directed approach/approximation of females to the section/shear of the glass tube, which emerged the airstream, containing it smelled pheromone.

Most probably that precisely it smelled pheromone it reminds it smelled vanilla, since males secrete it only in the period of

floor/sex activity. This, by the way, it prompts the path of the empirical search for pheromone.

At the same time, mutual reactions of males and females, which precede mating, give grounds to assume that the females also produce the pheromone, calling the reciprocal action/effects of males, which can be attributed to the category of aphrodisiac [3].

The laboratory observations of the behavior of the individuals showed that after mating the response reactions of females to the pheromone of males sharply weaken. Under conditions of the arena of female after mating they were very inert, only rarely detecting weak response reactions.

Thus, the conducted investigations show that in shield bug under natural conditions the processes of reproduction/multiplication are regulated by pheromones, also, first of all by the floor/sex pheromones which produce the males.

Table 2. Duration of the approach of the individuals of the bug before copulation.

| (1) Продолжительность сближения в мин. | Количество пар (2) | |
|---|--------------------|------|
| | (3) число | % |
| 1-6 | 35 | 71,4 |
| 9-10 | 4 | 8,2 |
| 11-30 | 10 | 20,4 |

Key: (1). Duration of approach in min. (2). A quantity is vapor. (3). number.

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